auto switch for toilets

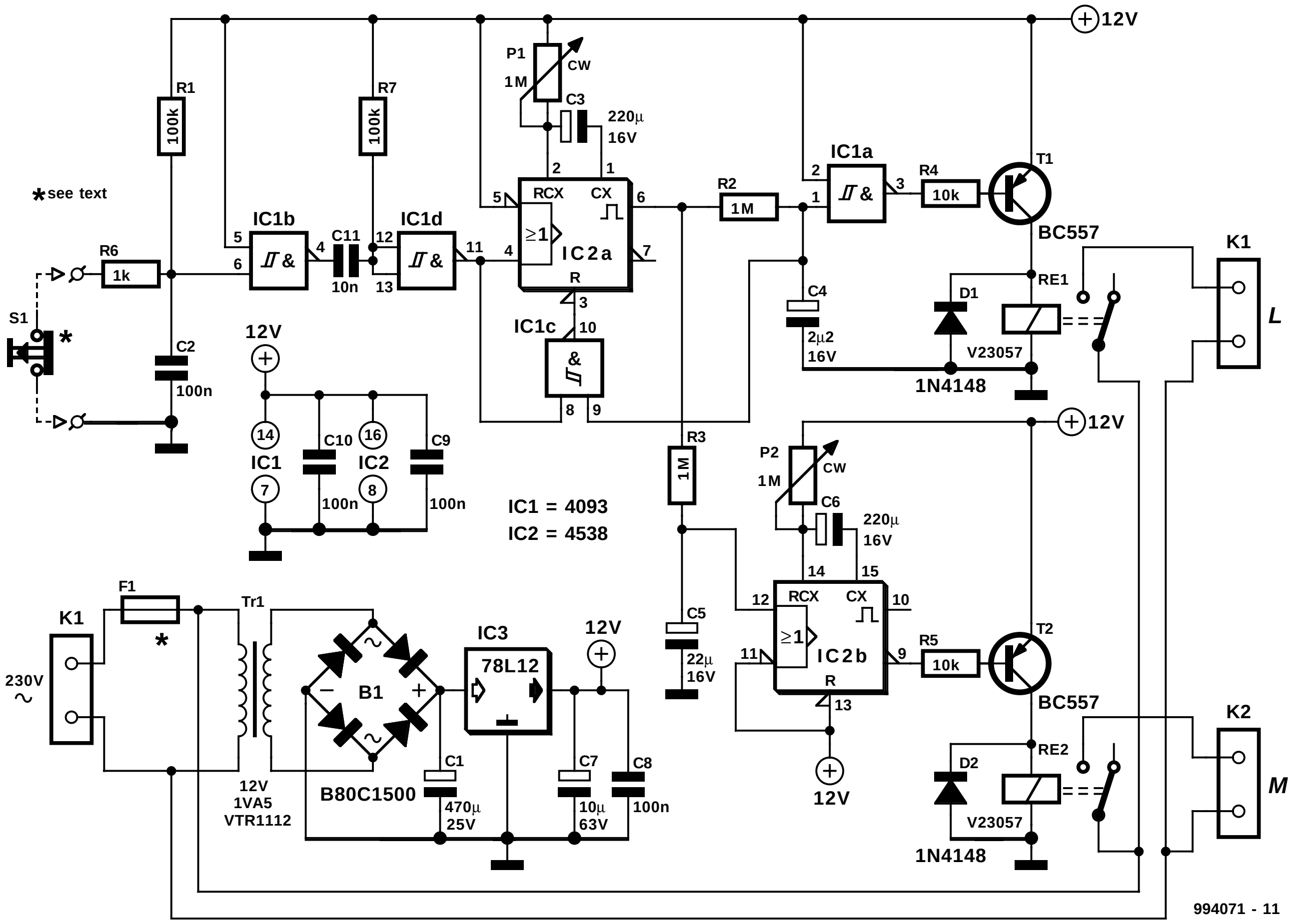
022

Design by L. Lemmens

The switch controls two relays, one, Re1, for turning the toilet light on and off, and the other, Re2, for turning an extractor fan on and off.

In th diagram, switch S1 is a reed switch fitted in the toilet door. A small magnet, fitted in the door post opposite the switch, ensures that the switch is closed when the door is shut. When the door is opened, the switch is opened also, whereupon the output of gate IC1b changes state (from low to high) so that monostable multivibrator (MMV) IC2a is triggered via inverter IC1d. During the mono time of the MMV, relay Re1 is energised via gate IC1a and transistor T1, whereupon the light is turned on. The maximum on time is set with preset P1.

The output of IC2a triggers a second MMV, IC2b, after a delay equal to the time constant R3-C5 (about 10 seconds). The second MMV energises relay Re2 via transistor T2, causing the extractor fan to be switched on. The mono time of IC2b is set with P2; it is, of course, advisable to make this rather longer than that of IC2a,



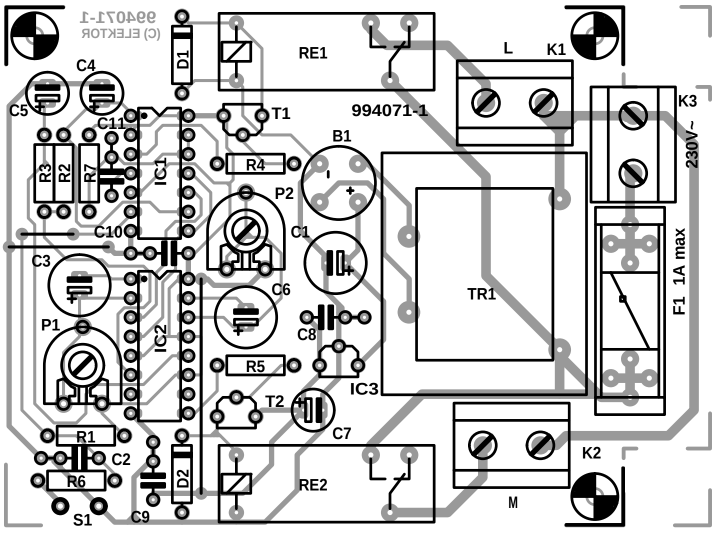
COMPONENTS LIST

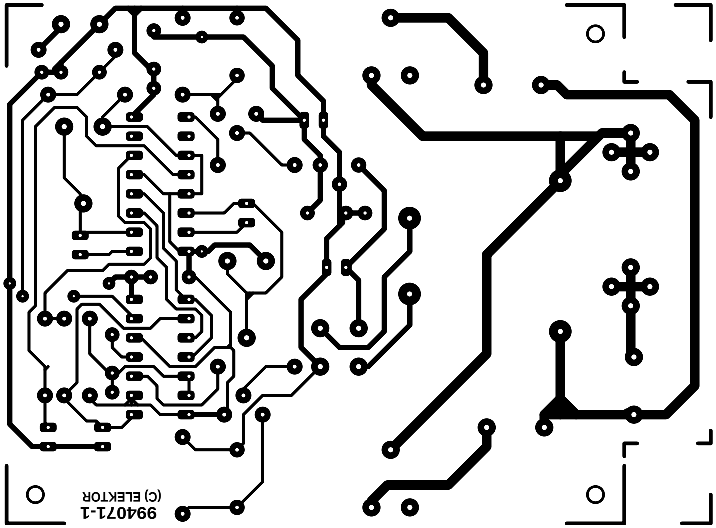
Resistors:
R1,R7 = 100kΩ
R2,R3 = 1MΩ
R4,R5 = 10kΩ
R6 = 1kΩ
P1,P2 = 1MΩ preset

Capacitors:
C1 = 470µF 25V radial
C2,C8,C9,C10 = 100nF
C3,C6 = 220µF 16V radial
C4 = 2.2µF 16V radial
C5 = 22µF 16V radial
C7 = 10µF 16V radial
C11 = 10nF

Semiconductors:
D1,D2 = 1N4148
T1,T2 = BC557
IC1 = 4093
IC2 = 4538
IC3 = 78L12

Miscellaneous:
K1,K2,K3 = PCB terminal block, pitch 7.5mm
S1 = reed switch with magnet
B1 = B80C1500, round case
F1 = 1A fuse with PCB mount holder
Tr1 = mains transformer, 12V, 1.5A secondary, e.g. Block VTR1112
Re1,Re2 = 12V relay, 1 change-over contact, e.g., Siemens V23057-B0002-A101.
Enclosure: e.g. Sarel type IP55
PCB, order code 994071-1





to keep the fan working for some time after the light has been turned off.

When the toilet door, and thus switch S1, is opened again, IC2a is triggered by a second leading edge and is reset, whereupon the light goes out. Network R2-C4 provides some delay in this, so that the person leaving the toilet is not immediately in darkness before the door is closed.

The control is best built on the PCB which is available ready-made through the Publishers' Readers Services (subject to availability). The completed board is best fitted in a plastic (ABS) case and fitted close to the light fitting in the ceiling or wall, where it may conveniently be linked to the mains via the existing wiring.

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